



NASA SmallSat Technology Partnerships 2021 Technology Exposition

Co-Hosted by
NASA Small Spacecraft Technology Program &
NASA Small Spacecraft Systems Virtual Institute

May 24, 2021
Hosted Virtually over WebEx

9:00AM – 2:25PM

All Times are Pacific Daylight Time

<i>Welcome and Perspectives</i>		<i>Speaker, Institution</i>
9:00AM PDT	<p>Welcome and Introduction</p> <p>Space Technology Mission Directorate (STMD)</p> <p>Science Mission Directorate (SMD) SmallSat Technology</p> <p>Human Exploration and Operations Mission Directorate (HEOMD)</p>	<p>James J. Cockrell <i>Chief Technologist, Small Spacecraft Technology Program</i></p> <p>Christopher E. Baker <i>Program Executive, Small Spacecraft Technology Program and Flight Opportunities Program</i></p> <p>Florence W. Tan <i>Deputy Chief Technologist, Science Mission Directorate, Chair, Small Spacecraft Coordination Group</i></p> <p>Andres Martinez <i>Program Executive, Advanced Exploration Systems (AES) Human Exploration and Operations Mission Directorate (HEOMD)</i></p>
<i>SmallSat Technology Partnerships Presentations</i>		
9:20AM PDT	<p>Move to Talk, Talk to Move: Tightly Integrated Communication and Controls for Coordinated Swarms of Small Spacecraft – [2018]</p> <p>Tight integration of communication and controls to enable a network of self-organizing small spacecraft to collaboratively monitor time-varying, distributed phenomena.</p>	<p>Dr. Qi Han <i>Colorado School of Mines</i> qhan@mines.edu</p>

9:40AM PDT	<p>Active Thermal Architecture for Cryogenic Optical Instruments (ATACOIC) – [2018]</p> <p>Advanced thermal control system consisting of a deployable solar radiator, rotational fluid joint, and thermal isolation system for miniature cryogenically-cooled instruments hosted on CubeSats.</p>	<p>Lucas Anderson, Dr. Charles Swenson <i>Utah State University</i> l.s.anderson@aggiemail.usu.edu charles.swenson@usu.edu</p>
10:00AM PDT	<p>Angles-only Absolute and Relative Trajectory Measurement System (ARTMS) - [2019]</p> <p>Software enables spacecraft to estimate orbits of external objects based on visible bearing angle measurements.</p>	<p>Dr. Adam Koenig, Justin Kruger, Dr. Simone D'Amico <i>Stanford University</i> adamkoenig90@gmail.com jkruger@stanford.edu damicos@stanford.edu</p>
10:20AM PDT	<p>Autonomous Nanosatellite Swarming using Radio-Frequency and Optical Navigation (ANS) - [2019]</p> <p>Distributed Dynamics, Guidance, Navigation and Control system with cm-level RF and optical relative nav with efficient on-orbit propagation of satellite relative motions. Enables swarms/clusters to cooperate for wide range of Earth or planetary observations.</p>	<p>Kaitlin Dennison, Dr. Simone D'Amico <i>Stanford University</i> kdenn@stanford.edu damicos@stanford.edu</p>
10:40-10:50AM	<i>Break</i>	
10:50AM PDT	<p>Miniature Optical Communications Transceiver (MOCT) – [2016]</p> <p>An optical communication system consisting of a software defined pulsed modulator, laser system, and avalanche photodetection system designed for SmallSat/CubeSat communication.</p>	<p>Dr. John Conklin <i>University of Florida</i> jwconklin@ufl.edu</p>
11:10AM PDT	<p>SPRINT: Scheduling Planning Routing Intersatellite Network Tool – [2018]</p> <p>Open-sourced software tool to plan and schedule remote observations, data crosslink, and downlink activities. Enables large constellation of resource-constrained SmallSats to maximize data downlink for global, real-time science.</p>	<p>Juliana Chew, Mary Dahl, Dr. Kerri Cahoy <i>Massachusetts Institute of Technology</i> jchew@mit.edu marydahl@mit.edu kcahoy@mit.edu</p>
11:30AM PDT	<p>High Specific-impulse Electro spray Explorer for Deep-space (HiSPEED) – [2018]</p> <p>A multi-staged ion Electro spray Propulsion System extends thruster lifetime and enables deep-space exploration with small satellites.</p>	<p>Dr. Paulo Lozano <i>Massachusetts Institute of Technology</i> plozano@mit.edu</p>
11:50AM PDT	<p>Distributed multi-GNSS Timing and Localization system (DiGiTaL) – [2016]</p> <p>Multi-GNSS unit for navigation and timing enables decentralized relative navigation with centimeter accuracy over separations up to hundreds of km.</p>	<p>Vince Giraldo, Dr. Simone D'Amico <i>Stanford University</i> vgiraldo@stanford.edu damicos@stanford.edu</p>

12:10PM PDT	<p>Development of New Low-Resource Magnetometers for Small Satellites – [2016]</p> <p>Reduced SWAP+C magnetometer mounts internal to CubeSats without requiring external booms. Uses precision AC and DC magnetic measurements and novel algorithms to achieve high precision.</p>	<p>Dr. Mark Moldwin <i>University of Michigan</i> mmoldwin@umich.edu</p>
12:30-12:40PM	<i>Break</i>	
12:40PM PDT	<p>Coded aperture imager for passive, dense depth sensing with low size, weight, and power – [2016]</p> <p>Time-windowed, efficient smoothing software based on coded aperture visible imaging to estimate relative poses and velocities between spacecraft.</p>	<p>Dr. Timothy Setterfield <i>Jet Propulsion Laboratory</i> timothy.p.setterfield@jpl.nasa.gov</p>
1:00PM PDT	<p>Distributed Attitude Control and Maneuvering for Deep Space SmallSats – [2018]</p> <p>Combines film-evaporation MEMS tunable array (FEMTA) technology with microscale fluid surface tension effects; electrothermal shutters enable low-power tunable thrust and thermal control.</p>	<p>Steven Puglia, Dr. Alina Alexeenko <i>Purdue University</i> spugia@purdue.edu alexeenk@purdue.edu</p>
1:20PM PDT	<p>Nano-Enabled Space Power System – [2016]</p> <p>Nanomaterial components for power systems (quantum dot/well solar cells; CNT wire harnesses; CNT-enhanced Li-ion batteries) increase capabilities at reduced weight.</p>	<p>Dr. Ryne Raffaele <i>Rochester Institute of Technology</i> rprsps@rit.edu</p>
1:40PM PDT	<p>Omnidirectional Inter-satellite Optical Communicator – [2016]</p> <p>A high bandwidth, full duplex, omnidirectional optical communication module for optical communication of spacecraft constellations at 100's km separations.</p>	<p>Dr. Ozdal Boyraz <i>University California of Irvine</i> oboyraz@uci.edu</p>
2:00PM PDT	<p>Leverage NASA Patented Technology for Your Business</p> <p>Learn how to use NASA patented technologies to enhance your business.</p>	<p>Jay Singh <i>Technology Transfer Office</i> ARC-TechTransfer@mail.nasa.gov</p>
2:20PM PDT	<p>Closing Remarks</p>	<p>James J. Cockrell <i>Chief Technologist, Small Spacecraft Technology Program</i></p>